Final Report

Permian Basin Rail Connection
Economic & Financial Feasibility Study

Prepared for

Texas Department of Transportation
Government and Public Affairs Division

Prepared by

Cambridge Systematics, Inc.

with

R.J. Rivera Associates, Inc.

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1.0 Introduction

American railroads are experiencing a period of growth unrivaled in the last four decades. From its peak in the 1960s, the freight railroad industry saw its market share decline against trucks and experienced an overall loss in total tons carried through the late 1990s. Railroads lost market share to trucks as the Interstate system provided a subsidized network for the trucking industry to drive down costs and send railroads – both Class Is and especially regional and shortline carriers – into a downward spiral. In the last few years, a convergence of factors enabled rail to regain some of its former glory in the form of a "rail renaissance." These factors include:

- **Surging global trade,** which relies heavily on the U.S. Class I transcontinental routes to link major gateway ports to population centers;

- **Population and economic growth**, which have outpaced investment in highway capacity, leading to increased delays for motor freight, especially around urban areas. This has made freight rail a more attractive transportation option for some commodities and markets; and

- **Rising energy demand,** which has pushed trucking costs higher to cover diesel fuel costs. This situation favors the lower unit costs of rail for some commodities. Demand for coal and the domestic push toward ethanol (which relies heavily on rail transportation) have also contributed to rail's recent surge.

This rail renaissance has boosted overall rail profits and employment, but the benefits are distributed unevenly through rail corridors and regions. In the Midland-Odessa metropolitan area, this rail renaissance has deepened the lack of rail access for local freight shippers. The number of rail shippers in the Midland-Odessa area has decreased steadily since the 1970s. This decline is attributable to two key factors. First, trucks provide more timely and flexible service for many of the region's inbound commodities and outbound products, including specialized equipment manufactured for the petroleum industry. Second, there have been dramatic increases in mainline rail volumes moved over Union Pacific Railroad's 'Texas Pacific' or 'TP' Line. The TP line is one of several Union Pacific Railroad (UPRR) "Restricted Access Mainline" corridors that link key trade gateways with inland markets and interchange points. Because of this function, the railroad has shifted away from providing local service to communities along the route unless rail shippers meet strict design criteria and traffic thresholds.

The tangible evidence of the decline of rail service is visible along the TP corridor in Midland and Ector Counties. Scores of derelict industrial rail spurs shoot off the TP mainline as it traverses industrial zones in Midland and Odessa. Now separated from the TP mainline, many of the former spurs were disjointed from the mainline during its upgrades. Due to the increasing traffic and related upgrades of the TP line, UPRR has raised the bar for local shippers, requiring costly automatic switches, sidings, and other investments that are economically prohibitive for companies that previously generated rail traffic, albeit modest in many cases.

1.1 Study Background and Approach

In response to the declining role of rail in the Midland-Odessa region, the La Entrada al Pacifico (LEAP) Rural Rail Transportation District (RRTD) has been active in efforts to reverse this trend. RRTDs, briefly described below, are public entities charged with regional rail planning and development. In 2007, the LEAP RRTD asked the Texas Department of Transportation (TxDOT) to provide assistance in examining the feasibility of extending a shortline railroad, the West Texas and Lubbock (WTLC), into its District to connect with Union Pacific Railroad (UPRR). The RRTD's Board of Directors encouraged TxDOT to provide guidance on this particular issue with the objective of increasing rail service to the District, which includes Ector and Midland Counties.

TxDOT responded to this request by jointly developing a scope of work with the RRTD Board and subsequently tasking Cambridge Systematics and RJ Rivera and Associates to engage in an economic and financial feasibility analysis of the new rail connection. This report presents our findings.

Rural Rail Transportation Districts

Midland and Ector Counties formed the LEAP RRTD on December 9, 2002 to "connect rail lines and to tie the rail and the La Entrada al Pacifico road together." The LEAP RRTD is one of 20 rural rail transportation districts across the State.

The 67th Texas Legislature authorized formation of Rural Rail Transportation Districts (RRTDs) in 1981 in response to the Staggers Rail Act of 1980. The Staggers Act partially deregulated the rail industry by enabling rail companies to abandon low-traffic rail lines rather than continuing service and maintenance on lines that did not carry enough traffic to be cost-effective. The RRTDs were seen as a way to help develop, maintain, and diversify the economy of the state by preserving rail as a viable transportation option in rural areas and contributing to the preservation of rural agricultural industries.

RRTDs have all the rights of a political subdivision of Texas State government and have the power to purchase, operate, and/or build new railroad and intermodal facilities, the right of eminent domain, and the ability to issue revenue bonds or grant anticipation notes. The State does not initiate their development and local boards—such as the LEAP Board—independently operate and invest without oversight from any other State agency, including TxDOT. While many RRTDs have not engaged the State in their planning or investment efforts, the LEAP RRTD and TxDOT have demonstrated good coordination for this study.

Adapted from "Rural Rail Transportation District Regulation & Administration". White Paper by Cambridge Systematics, Inc. for the Texas Department of Transportation.

Approach

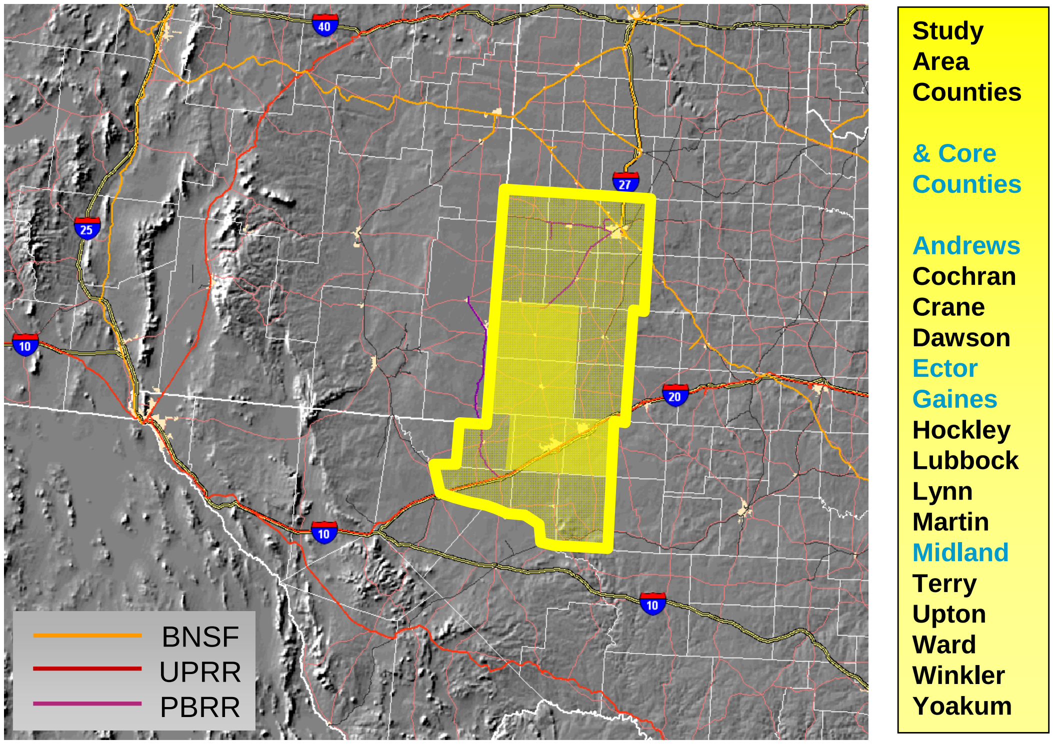
The primary goal of this study is to determine the economic and financial feasibility of developing a north-south rail line connecting the Texas Pacifico, Union Pacific, and BNSF Railway lines in the LEAP RRTD. Currently there is no north-south rail linkage serving agricultural and industrial shippers in this corridor, many of which would benefit from economy of scale rail rates to move certain commodities such as intermodal and bulk. While this study includes planning elements, its ultimate intent is to provide an implementation strategy based on economic and financial feasibility analysis. This strategy will guide TxDOT, the LEAP RRTD, and other partners toward development, including the next steps of environmental study, preliminary engineering, and financial partnership. To that end, the study seeks to answer the following questions:

- *Would a new rail line attract sufficient traffic to warrant its construction?*
- *Which existing shippers in the region would use the line and would they and/or the carriers provide adequate financial backing to support construction and continued operation?*
- *What are the potential obstacles – physical, financial, or regulatory – that inhibit development of the rail line and how can the rail district and its partners overcome them?*
- *What are the next steps and actions that TxDOT, LEAP, or other partners can take to move rail development toward design engineering, financing, and construction?*

1.2 Study Area

The geographic focus of this study is the LEAP RRTD jurisdiction of Ector and Midland Counties plus the counties of the proposed corridor. Figure 1.1 identifies the counties of the study. Those counties shaded opaque yellow represent the "core" counties between the terminus of the West Texas Lubbock Railroad at Seagraves and the Union Pacific TP line in the Midland-Odessa region.

Figure 1.1 Study Area



Source: FRA, ESRI, and Cambridge Systematics.

1.3 Report Outline

The remainder of this report consists of five sections, described below, that discuss the key issues related to rural corridor development.

- **Section 2 – Conceptual Alignment and Costs –** This section provides detail on the physical alignment between Seagraves and McCamey and presents the costs of construction and continued maintenance.

- **Section 3 – Economic Demand Analysis –** This section presents the findings of the economic demand analysis to determine whether the new line would attract sufficient traffic to warrant its construction.

- **Section 4 – Financial Feasibility Analysis –** This section provides the results of the financial feasibility analysis, including revenue estimates from a railcar fee and strategies to close the financing gap.

- **Section 5– Alternative Opportunity –** During the course of this study, we have identified an immediate potential need to construct a high-quality industrial access spur to meet increasing demand for local rail service in the Midland-Odessa region. This section provides details on this opportunity.

- **Section 6 – Conclusions and Implementation Strategies –** This briefly summarizes the conclusions of the study and outlines the next steps the LEAP RRTD should take toward implementing construction projects that would meet the goal of increasing rail traffic in the area.

2.0 Conceptual Alignment and Costs

The alignment of the proposed rail corridor runs from Seagraves, Texas to McCamey Texas, spanning nearly 150 miles and linking four railroads. The CS team developed the alignment route through field reconnaissance, interviews with local officials, consultation with TxDOT and the affected railroads, and analysis of satellite imagery and maps. We emphasize that the alignment selected is a conceptual alignment for order-of-magnitude cost estimation purposes only. Its sole purpose is to provide a basis of comparison to the potential revenue needed to obtain financing for construction. A subsequent engineering study would determine the precise alignment if justified by the findings of this study.

2.1 Alignment Description

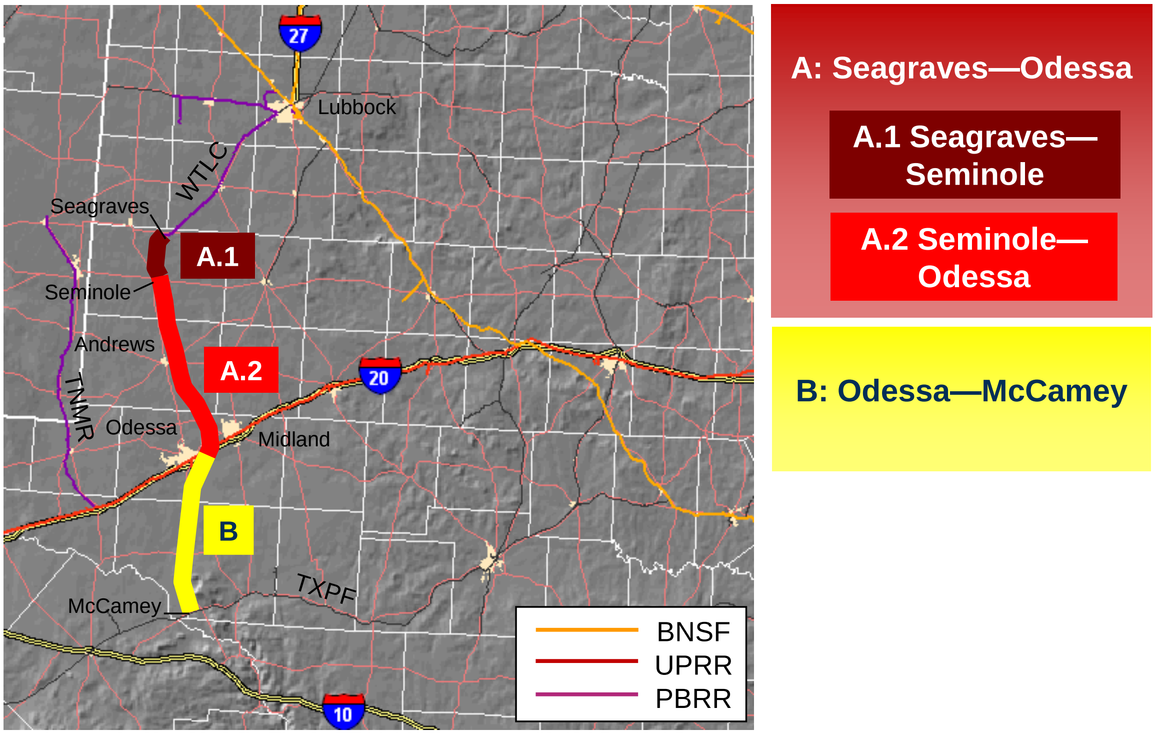
We used the following guidelines to develop the conceptual alignment in a way that streamlines the cost and speed of the development process:

1. Minimize segment distances thereby reducing linear costs;
2. Control costs by minimizing or eliminating grade separations and utility conflicts; and
3. Minimize impacts to communities, environmentally sensitive areas, and utilities.

In order to provide greater detail on the physical characteristics, costs, and demand estimates, we divided the alignment into three segments. Those segments include A.1 from Seagraves to Seminole; A.2 from Seminole to Odessa; and B from Odessa to McCamey. We made the divisions at natural breaks in rail markets, typically focused on one of the activity centers or rail connections to other carriers, such as UPRR or TXPF.

The following descriptions are planning level approximations for order-of-magnitude cost estimating purposes only.

Figure 2.1 Alignment Route



Source: Cambridge Systematics, FRA, ESRI.

A.1 Seagraves to Seminole

The proposed rail line begins at the terminus of the West Texas and Lubbock Railway (WTLC), in southwest Seagraves, on the eastern side of U.S. 62/U.S. 385. It then follows U.S. 62/U.S. 385 on its eastern side, southwestward and then southward to Seminole. The rail line leaves U.S. 62/U.S. 385 on the north side of Seminole and bypasses Seminole on its eastern side. This segment is approximately 16.4 miles in length.

A.2 Seminole to Odessa

From southeast of Seminole, the proposed rail line continues southward to Telephone Road where it proceeds southeastward along and on the north side of Telephone Road. It continues along Telephone Road, which becomes RR1788, to SH 158 where it crosses to the south side of SH 158 and follows it southeastward. At a point approximately 4.5 miles northwest SH 191, the rail line turns southward, away from SH 158, crossing SH 191 and continuing south to tie into the UPRR east of Midland International Airport. This segment is approximately 63.2 miles in length.

B. Odessa to McCamey

From the UPRR main line, the proposed rail line proceeds southward across IH 20, then orients southwest, crossing Monahans Draw and generally following U.S. 385 south to Crane. The line bypasses Crane to the west then continues south to McCamey, generally parallel with U.S. 385, until interchanging with the Texas Pacifico's South Orient line west of McCamey. This segment is approximately 68 miles in length.

2.2 Alignment Cost Estimates

With the basic physical attributes of the alignment determined, we estimated the alignment costs by segment and for the proposal in its entirety. The total cost estimate for the entire 147.6-mile route is $556 million dollars (2007 dollars), as shown in Table 2.1. Of the three segments analyzed, the segment between Seagraves and Seminole is the least expensive because it covers a shorter distance between principal cities and because there are fewer structures or other expensive adaptations to the line.

Table 2.1 Estimated Construction Costs

		Estimated Costs ($Millions 2007)	
Alignment Segment	**Miles**	**Total**	**Per Mile Average**
A.1 Seagraves to Seminole	16.4	$ 44.4	$2.7
A.2 Seminole to Odessa	63.2	$241.1	$3.8
B Odessa to McCamey	68.0	$270.7	$3.9
Total	**147.6**	**$556.2**	**$3.8**

Note: Costs vary by number of structures (rail and highway), land acquisition costs (urban versus rural), and reconciliation of oil field infrastructure within the proposed ROW.

Cost Methodology

In determining the cost estimates, we relied on recent studies and interviews to establish current unit prices reflective of costs in West Texas. This study bases its costs on per-mile costs for general linear construction with unit costs for structures. Basic assumptions include:

- **$2.65 million per mile construction cost** for a single-track, 286,000 lb. capacity railroad. This cost includes design, construction, and environmental mitigation, but does not include right-of-way (ROW) acquisitions.

- **$4,000 (rural land) to $517,000 (urban land) per mile ROW cost.** This cost is per mile land for land acquisition to develop a 50-foot right-of-way.

- **Additional costs** applied to specific conditions or structures. For utilities relocation in oil fields, the per-mile construction cost rose by $1 million. Roadway and railway structures cost $8 million and $35 million each, respectively.

Table 2.2 shows alignment characteristics for each of the three segments analyzed.

Table 2.2 Alignment Characteristics by Segment

Alignment Segment		Total Miles	Urban Miles	Rural Miles	Oil/Gas Field Miles	Rail Structures	Highway Structures
A.1	Seagraves to Seminole	16.4	1.7	14.7	-	-	-
A.2	Seminole to Odessa	63.2	3.0	60.2	47.8	-	3
B	Odessa to McCamey	68.0	-	68.0	20.2	2	-
Total		**147.6**	**4.7**	**142.9**	**68.0**	**2**	**3**

Note: Costs vary by number of structures (rail and highway), land acquisition costs (urban versus rural), and reconciliation of oil field infrastructure within the proposed ROW.

Cost Data Sources

The TxDOT Lubbock District provided cost data for the relocation of the WTLC rail line for the Martha Sharp Freeway project in Lubbock. TxDOT provided complete project costs for the 12.52-mile railway segment, including environmental factors, design, right-of-way acquisition, and construction. We adjusted the environmental, design, and construction costs to inflation and factored them to a per-mile unit costs for this estimate.

The TxDOT Odessa District provided an estimate of $1 million per mile in additional cost for utilities reconciliation when the line passes through oil and gas fields. While one of the primary goals of the alignment routing was to avoid oil infrastructure, some interference is inevitable over long distances in the Permian Basin.

We obtained rural land acquisition costs from the Texas A&M University Real Estate Center and converted the cost per acre to a cost to a per-mile for a 50-foot ROW. Historical data enabled us to factor the estimate to 2007 prices. Based on this analysis, the average acquisition cost per mile of rural land is $4,000.

Using information from the Martha Sharp project, and inflating by land appreciation factors for the region, we estimated a per-mile cost of $517,000 for ROW acquisition.[1]

While kept to a minimum, it was necessary for the proposed rail alignment to cross highways and conversely, especially in situations where highway traffic would warrant grade separation. The unit cost per highway structure is $8 million. The unit cost per railway overpass in this study is $35 million per structure. Much of this additional cost due to the grading required for the approaches. In some situations, it may be more cost effective to keep the new rail line at grade and place the highway into a below-grade cut.

2.3 Other Costs

In addition to construction costs, this report estimates annual costs for operations and maintenance. We did not estimate the costs of upgrading the West Texas and Lubbock Railway or the financing costs for operations or maintenance (presented in Section 4). This cost estimate also excludes start-up costs for rolling stock, equipment, vehicles, and buildings. The 'other' costs include:

- **Operations costs.** The largest components of operations costs are labor, then fuel. The industry average for the shortline industry is $15,000 per mile per year.
- **Annual maintenance costs.** The industry average for shortline railroads is $10,000 per mile per year. Most of this cost relates to maintenance of track, ties, ballast, signals, signs, and structures.[2]

Table 2.3 shows the estimated operations and maintenance costs for each of the three segments analyzed.

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[1] Texas A&M University Real Estate Center.

[2] Based on American Short Line and Regional Rail Association's *Facts and Figures* 2004 average maintenance expenditure of 15 percent of gross revenue and Tennessee Department of Transportation's Proposed Minimum Maintenance Requirements for the Tennessee Shortline Railroad Track Rehabilitation Program.

Table 2.3 Estimated Annual Operations and Maintenance Costs

	Estimated Costs ($ 2007)	
Alignment Segment	**Operations**	**Maintenance**
A.1 Seagraves to Seminole	$264,000	$164,000
A.2 Seminole to Odessa	$948,000	$632,000
B Odessa to McCamey	$1,020,000	$680,000
Total	**$2,214,000**	**$1,476,000**

2.4 Total Cost

Combining the construction, operations, and maintenance costs, we calculated the total cost for the project over an assumed 30-year period, from construction to full retirement of financing. The total cost for this 30-year period is just over $1 billion dollars, including construction financing costs of $343 million over the 30-year term. The financing assumes a 3.5 percent interest rate on the financing vehicle, which could be a mix of public and private capital. Table 2.4 summarizes the components of total cost over a 30-year period, not accounting for inflation. Section 4 will compare the total cost to potential revenues to produce a financial feasibility recommendation.

Table 2.4 Total Project Cost
2010 to 2040

		Estimated Costs ($ Millions 2007)	
Alignment Segment	**Construction** (includes Financing)	**Other Costs (Operations, Maintenance)**	**Total**
A.1 Seagraves to Seminole	$71.8	$12.8	$84.6
A.2 Seminole to Odessa	$389.8	$47.4	$437.2
B Odessa to McCamey	$437.6	$51	$488.6
Total	**$899.1**	**$111.2**	**$1,010.3**

Texas Department of Transportation

3.0 Economic Demand Analysis

One fundamental question of the study is whether there is sufficient freight rail demand to justify development of the rail connection between Seagraves and McCamey. This section summarizes the process and the findings of the economic demand analysis conducted to answer this question utilizing a combination of data from Federal, state, and private sources.

3.1 Demand Analysis Approach

We utilized freight data from several sources to develop the demand estimates for the proposed alignment. Table 3.1 summarizes the principal data sources.

Table 3.1 Demand Estimate Data Sources

Data	Source	Period	Modes
Carload Waybill Sample	Surface Transportation Board	2003	Rail
Industry Interviews	Regional shippers	Current (2007- 2008)	Rail and truck
TRANSEARCH	Global Insight	2003 to 2030	Rail and Truck
U.S. Agricultural Statistics	USDA	2003	Total tons by commodity to supplement Waybill and TRANSEARCH data

To identify the level of freight rail demand for the proposed Seagraves-McCamey link, we built up the total demand figures from estimates of truck-to-rail diversion and expansion demand. The components of those estimates include:

- **Truck-to-Rail Diversion.** This includes local truck diversion and through truck diversion and is the principal source of rail demand for the new facility.
  - **Local truck diversion** includes freight originating and terminating within the study area counties that diverts from truck to rail because the new connection offers a better alternative, usually driven by lower overall cost.

  - **Through Truck Diversion** includes through traffic (without an origin or destination within the study area) diverting from truck to the new connection.

- **Expansion Demand.** This consists of new rail traffic from expansion of existing or development of new shipper operations attributable to the rail development or new traffic from newly arriving shippers that located or relocated to the area for its improved rail service.

To develop the demand estimates, we first analyzed the base year data to form a benchmark of current truck and rail behavior. We selected 2003 as the base year because that is the most recent common year available in the principal data sources available from TxDOT. For future years, we relied most heavily on the commodity and mode specific forecasts embedded in the TRANSEARCH data.

3.2 Base Year Demand Characteristics

We assessed both truck and rail demand in the region using the data sources described above. The following sections describe key findings of this analysis.

Rail Demand

Table 3.2 summarizes current local rail market demand for study area counties. In 2003, freight railroads originated or terminated more than 34,000 carloads representing nearly 3.1 million tons. Lubbock County is the top freight rail county in the region, with more than 60 percent of the 3.1 million annual regional tons.

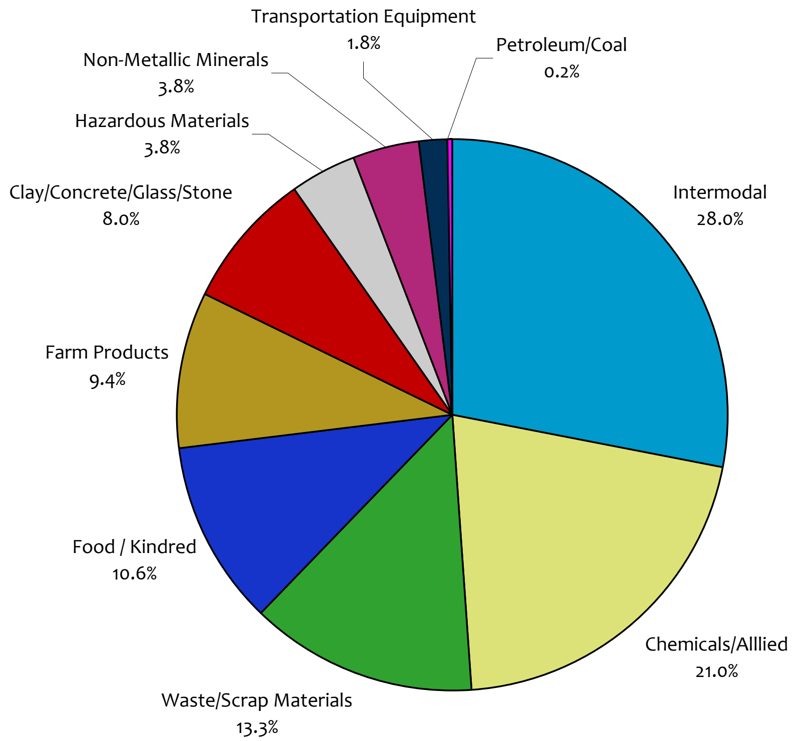
Table 3.2 – Current Local Rail Market Demand (2003)

County	Originating Traffic			Terminating Traffic			Total	
	Carload Units	Intermodal Units	Total Tons	Carload Units	Intermodal Units	Total Tons	Total Carloads	Total Tons
Andrews								
Cochran				336		33,008	336	33,008
Crane								
Dawson								
Ector	940		208,780	4,040		328,516	4980	537,296
Gaines	920		83,200	628		62,140	1548	145,340
Hockley	40		3,080	36		3,516	76	6,596
Lubbock	12,144	5,960	1,040,436	9,728	5,280	883,396	21872	1,923,832
Lynn								
Martin				280		28,280	280	28,280
Midland	720		51,480	2,252		195,496	2972	246,976
Terry	424		41,612	444		43,632	868	85,244
Upton				360		35,960	360	35,960
Ward	168		3,780	628		44,552	796	48,332
Winkler								
Yoakum			–					
Total	**15,356**	**5,960**	**1,432,368**	**18,732**	**5,280**	**1,658,496**	**34,088**	**3,090,864**

Source: 2003 STB Carload Waybill Sample Data.

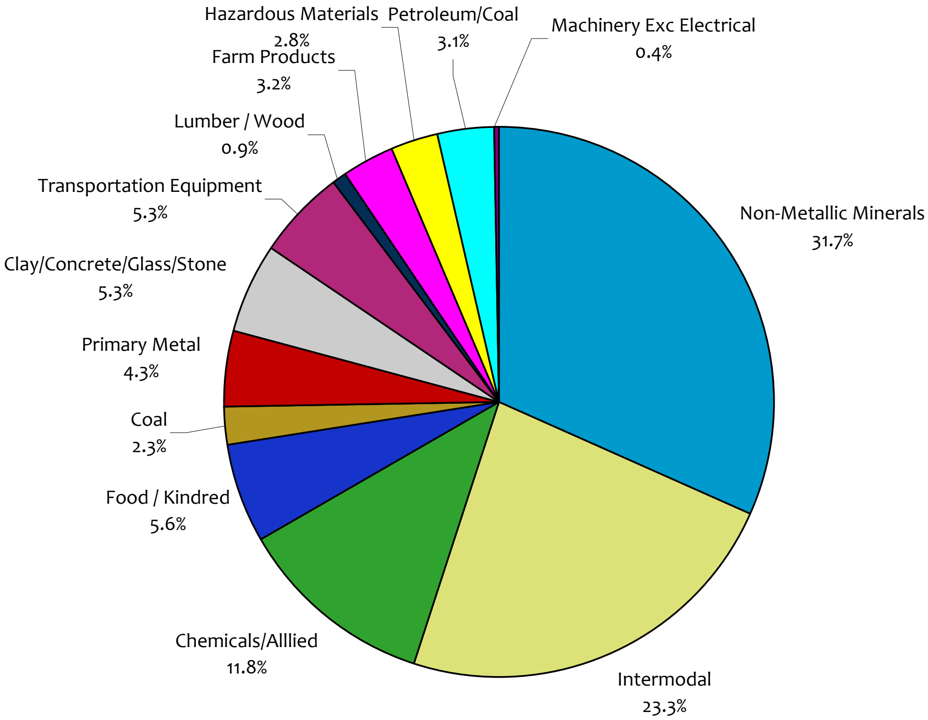
Figures 3.1 and 3.2 illustrate the commodity mix of railcars originating and terminating in the study area counties. The graphs also include intermodal units, which affect Lubbock County only.

Figure 3.1 2003 Originating Rail Commodities Study Area Counties



Source: 2003 STB Carload Waybill Sample Data.

Figure 3.2 2003 Terminating Rail Commodities Study Area Counties



Source: 2003 STB Carload Waybill Sample Data.

Base Year Rail Observations

From the base year data, we observe the following for the study area counties:

- The **top commodities** moved by rail in the study area include non-metallic minerals, waste/scrap materials, chemicals, farm products (including cottonseed and raw cotton), and food and kindred products.

- **There is no internal rail traffic in the region.** According to the data sources, there are no internal rail moves within the study area. By contrast, trucks move approximately 3.5 million annual tons within the 16-county study area.

- **Rail shipments of intermodal units are limited**. Lubbock County is the only jurisdiction in the study area with measurable intermodal traffic. Most of this is containerized cotton bales. The nature of intermodal rail operations dictates that these trips originate and terminate at regional terminals where railroads can attract sufficient containers to form significant traffic.

- **Lubbock is top regional rail center.** Even though the Midland-Odessa and Lubbock metro have nearly the same population, about 250,000 each, the Lubbock region generates three and a half times more rail freight. We attribute this disparity to

Lubbock's proximity to a concentration of agricultural shippers and its robust transload and yard operations relative to Midland-Odessa. In addition, the BNSF mainline through Lubbock has more capacity for locally generated carloads because it carries less long-distance traffic than the UPRR TP Line that traverses Ector and Midland Counties and is less capacity constrained.[3]

- **WTLC counties generate significant rail demand (measured in tons).** Counties served by the West Texas Lubbock Railway (WTLC) have significant railcar and tonnage figures. Gaines and Terry Counties are the leading generators along the West Texas and Lubbock route.

Truck Demand

With a 94 percent mode share, trucks carry the majority of freight in the study area. Despite rising fuel and labor costs, trucking remains extremely competitive throughout the United States and in this region because of its flexibility and speed. Table 3.3 summarizes local truck market demand for 2003 for the study area counties.

Table 3.3 Current Local Truck Market Demand (2003)

County	Originating Traffic		Terminating Traffic		Total	
	Tons	Truckloads	Tons	Truckloads	Tons	Truckloads
Andrews	509,241	56,615	1,436,788	73,676	1,946,029	130,291
Cochran	2,121	16,243	712,777	33,233	714,898	49,476
Crane	324,013	35,564	1,096,774	52,778	1,420,787	88,342
Dawson	339,535	37,790	1,077,924	64,303	1,417,459	102,093
Ector	3,030,197	295,141	5,740,991	326,682	8,771,188	621,823
Gaines	1,260,770	91,528	1,438,870	91,484	2,699,640	183,012
Hockley	510,879	66,089	1,554,312	89,885	2,065,191	155,974
Lubbock	7,192,575	445,702	4,866,478	396,676	12,059,053	842,378
Lynn	22,374	12,696	558,599	26,630	580,973	39,326
Martin	29,807	16,146	695,356	31,721	725,163	47,867
Midland	2,387,759	189,155	3,290,464	201,115	5,678,223	390,270
Terry	90,011	30,753	1,273,674	60,038	1,363,685	90,791
Upton	281,620	29,119	862,933	41,931	1,144,553	71,050
Ward	848,517	69,193	1,232,548	71,961	2,081,065	141,154
Winkler	50,195	22,971	847,931	38,155	898,126	61,126
Yoakum	2,540,517	167,396	1,737,364	167,592	4,277,881	334,988
TOTAL	19,420,130	1,582,102	28,423,783	1,767,861	47,843,913	3,349,963

Source: TRANSEARCH 2003.

[3] American Association of Railroads *National Rail Capacity Study,* 2007.

Base Year Truck Observations

From the base-year truck data, we observe the following for the study area counties:

- The **top commodities** moved by truck in the study area, ranked in order of tonnage, include petroleum and coal (24 percent); chemicals (17 percent); non-metallic minerals (16 percent); clay/concrete/glass/stone (13 percent); secondary moves (warehouse and distribution) (8 percent), food and kindred products (6 percent); lumber/wood (5 percent); and primary metal (4 percent).

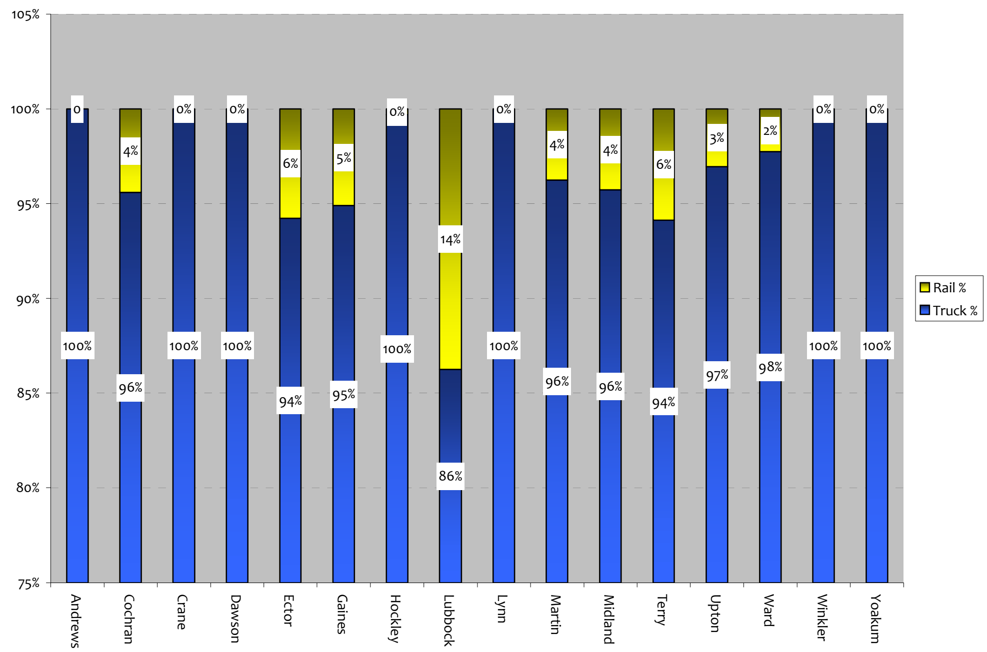
- **Trucks carry many "rail-divertible" commodities.** Many of the top tonnage commodities moved by truck in the study region – including chemicals and non-metallic minerals – are highly amenable to rail shipment because they are typically high-weight, low unit cost, and not time-sensitive.

- **Midland-Odessa is the top truck generator in the region**. With more than 1 million combined annual originating and terminating truck trips, the Midland-Odessa metropolitan area is the single largest truck generator in the study region.

Comparing Truck and Rail Mode Shares

Figure 3.3 illustrates the mode share of truck and rail by tonnage by county. In every county in the study area, trucks account for at least 86 percent of the total originating and terminating tonnage. Taken as a whole, the study area relies on trucking to carry approximately 94 percent of the total tonnage. The mode share of rail in the study area is low relative to the rest of the United States and Texas. This type of low mode share can indicate market potential for rail.

Figure 3.3 Mode Splits Truck versus Rail (2003) by County



US Mode Split:

Truck	83%
Rail	13%
Water	4%

Texas Mode Split:

Truck	74%
Rail	18%
Water	8%

Study Area Mode Split:

Truck	94%
Rail	6%

Source: STB Carload Waybill Sample, TRANSEARCH, and FHWA.

3.3 Diversion Assumptions

Drawing from existing studies, knowledge of rail and truck operations thresholds, and circumstances specific to the region, we developed a series of assumptions to guide the diversion potential for truck-to-rail diversion, and expansion demand.[4] The diversion analysis assumes the following:

- **Total Diversion.** Recent national studies assume 10 percent of all truck traffic diverts to rail if truck trip distances and commodities are divertible to rail. This basic assumption could be higher in West Texas, up to 20 percent, due to preponderance of rail divertible commodities (agriculture, minerals, etc.). For this study, we customized the diversion rate to reflect the ability of the new line to attract at least the average Texas rail mode share.

- **Distance.** Because rail performs more cost effectively at longer distances, the truck trips eligible for rail diversion are those traveling 330 miles to or from the study area.

[4] Expansion demand is the number of new railcars generated from either expansion of existing rail shippers or relocation of shippers to the region. See Section 3.5 for additional detail.

This is comparable to a one-way trip from Seagraves to the Dallas-Ft. Worth Metroplex and closely relates to the average originating and terminating tonnage distances for the study area in the TRANSEARCH data. For some commodities, rail diversion becomes economical at even shorter distances. For this analysis, we eliminated the distance requirement for certain commodities that show a high propensity for rail use at any distance. Even with these adjustments, the general rule is that short truck trips are less amenable to diversion to rail.

- **Commodities.** The first group of divertible commodities consists of those that shippers are currently draying to and from railheads because of a lack of service (especially in Gaines County). The next group of divertible commodities is the mix of cargo currently carried by rail in the region, especially for originating and terminating commodities. For this study, the drayed commodities largely coincide with those currently shipped on the WTLC, including:

  – Chemicals (sodium sulfate in covered hoppers, fertilizers in tank cars);

  – Peanuts (in covered hoppers and box cars);

  – Cotton (bales and seed);

  – Grain;

  – Farm Machinery;

  – Lumber;

  – Oilfield Supplies;

  – Plastic; and

  – Rock.

  Additional divertible commodities include those that typically have a higher rail mode share in other parts of Texas but that have a low mode share in this region. Based on our analysis for this study, the major commodity groups with low rail mode share in the study area relative to Texas include the following:

- Farm Products
- Paper and Allied Products
- Transportation Equipment
- Food and kindred products
- Non-metallic minerals
- Chemicals and allied products
- Primary metals

Table 3.4 contains a more detailed list of these commodities and their relative mode shares

■ 3.4 Truck-to-Rail Diversion

The truck-to-rail diversion analysis consists of several steps. First, we identify divertible commodities. Next, we identify the population of truck traffic potentially eligible for diversion based on origin-destination patterns and trip distance. Because of its proximity to the proposed rail link and its parallel orientation, truck flows on the U.S. 385 corridor provide the primary source of potentially divertible trips.

Divertible Commodities

To determine which truck commodities have diversion potential and to identify the extent of diversion potential, we compared the Texas mode share 50 major commodity classes used in TRANSEARCH and the Carload Waybill Sample[5] data to the mode shares in the 16-county study region. Table 3.4 shows the results of that analysis, illustrating rail share deficiencies for commodities moved in the study area relative to other parts of Texas.

As shown in Table 3.4, the rail share of study area counties is approximately 4 percent, or 13 percent lower than the Texas statewide average. This indicates that with better rail service there is potential to increase the rail mode share. Some commodities have higher potential than others, indicated in descending order in the table. Among those exhibiting the highest potential for diversion include transportation equipment, farm commodities, chemicals, paper, food, and primary metals. Conversely, it appears that two commodity classes in the region – coal and waste – have a higher-than-Texas mode share for the study area and therefore do not show potential for additional rail diversion. We stress that this table shows potential diversion based on mode share; we did not weight it to the tonnage of commodities in the region. While some of the percentages may indicate serious diversion potential, there may not be sufficient tonnage in some commodity classes. The diversion analysis that follows applies these share percentages to the total potential tonnage to estimate truck-to-rail diversion.

The analysis does not explicitly presume any diversion of intermodal containers. There is very low demand at this time, and into the future, for through container moves of sufficient distance to make economic sense to divert to rail. The lack of container transload facility in the region outside of Lubbock compounds this situation. With the possibility of the Reece Center development as a intermodal container yard, future shipments of containerized rail shipments, especially for baled cotton, will gravitate to the closest and most sizeable transload facility. Given this situation, the only containerized demand estimated is for commodities that may travel by container, but TRANSEARCH does not specify shipment form, only overall tonnage or value of shipments.

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[5] Standard Transportation Commodity Code (STCC) Classification System.

Table 3.4 Truck-to-Rail Commodity Diversion Potential

		Texas		Study Region Counties		Study Region Rail Deficit or Surplus
STCC	Commodity Class Description	Truck	Rail	Truck	Rail	
37	Transportation Equipment	62%	37%	92%	8%	**-29%**
1	Farm	13%	84%	44%	56%	**-29%**
28	Chemicals/Allied	49%	28%	90%	10%	**-18%**
26	Pulp/Paper/Allied	83%	17%	100%	0%	**-17%**
20	Food/Kindred	84%	16%	99%	1%	**-15%**
33	Primary Metal	83%	15%	95%	5%	**-10%**
14	Non-metallic Minerals	87%	12%	95%	5%	**-7%**
23	Apparel	89%	6%	100%	0%	**-6%**
29	Petroleum/Coal	58%	7%	99%	1%	**-6%**
24	Lumber/Wood	95%	5%	100%	0%	**-5%**
39	Miscellaneous Manufacturing	95%	5%	100%	0%	**-5%**
36	Electrical Equip	95%	4%	100%	0%	**-4%**
25	Furniture/Fixtures	95%	3%	100%	0%	**-3%**
30	Rubber/Plastics	97%	2%	100%	0%	**-2%**
27	Printed Matter	95%	2%	100%	0%	**-2%**
38	Instruments	96%	2%	100%	0%	**-2%**
35	Machinery Exc Electrical	93%	2%	100%	0%	**-2%**
32	Clay/Concrete/Glass/Stone	94%	6%	96%	4%	**-2%**
22	Textile Mill	98%	1%	100%	0%	**-1%**
34	Fabricated Metal	97%	1%	100%	0%	**-1%**
31	Leather	97%	0%	100%	0%	**0%**
49	Hazardous Materials	100%	0%	100%	0%	**0%**
50	Secondary Moves	100%	0%	100%	0%	**0%**
11	Coal	21%	79%	12%	88%	**9%**
40	Waste/Scrap Materials	7%	57%	0%	100%	**43%**
Total		**74%**	**18%**	**96%**	**4%**	**-13%**

Source: TRANSEARCH.

Current and Future U.S. 385 Truck Traffic

Because it parallels the proposed rail link, the U.S. 385 corridor provides the most available source of potential rail traffic. To ascertain the diversion potential, we analyzed rail eligible commodities currently moving by truck on the U.S. 385 corridor. Through a process known as "select link analysis," the analysis considered truck traffic on U.S. 385 between Seagraves and McCamey to estimate tonnage and truckloads on the corridor.

According to TRANSEARCH, approximately 394,000 trucks carried nearly 5 million annual tons on U.S. 385 between Seagraves and Odessa in the base analysis year (2003). This translates into nearly 1,100 daily trucks. This daily volume is comparable to TxDOT truck counts for the same period.[6]

Between Odessa and McCamey, TRANSEARCH shows approximately 311,000 trucks carrying 5.7 million tons in 2003. This represents about 850 daily trucks, which is slightly higher than TxDOT counts for the segment.[7]

Commodities

The leading truck commodities along the entire corridor between Seagraves and McCamey are petroleum, non-metallic minerals, and chemicals, representing approximately 26, 19, and 16 percent of tonnage, respectively. The next significant commodity class, accounting for 17 percent of the total tonnage is secondary moves. Secondary moves are typically warehouse or distribution moves. The next four highest commodity classes are clay/concrete/glass/stone (7 percent); food and kindred product (6 percent); lumber/wood (4 percent); and primary metals (4 percent).

The commodity profile of U.S. 385 between Odessa and Seagraves varies by segment, and when we examined the tonnage between the chief junctions (Odessa, Andrews, Seminole, and Seagraves), we found that the highest tonnage segment is between Seagraves and Seminole, where U.S. 385 carries about 2.8 million tons. Much of this is the 1.5 million tons of non-metallic materials that move on this segment of U.S. 385.

Between Odessa and McCamey (and south to the I-10 corridor), the commodity profile on U.S 385 is more uniform. The top commodities on this part of U.S. 385 are petroleum and chemicals, together comprising nearly 55 percent of total tonnage.

Future Trend

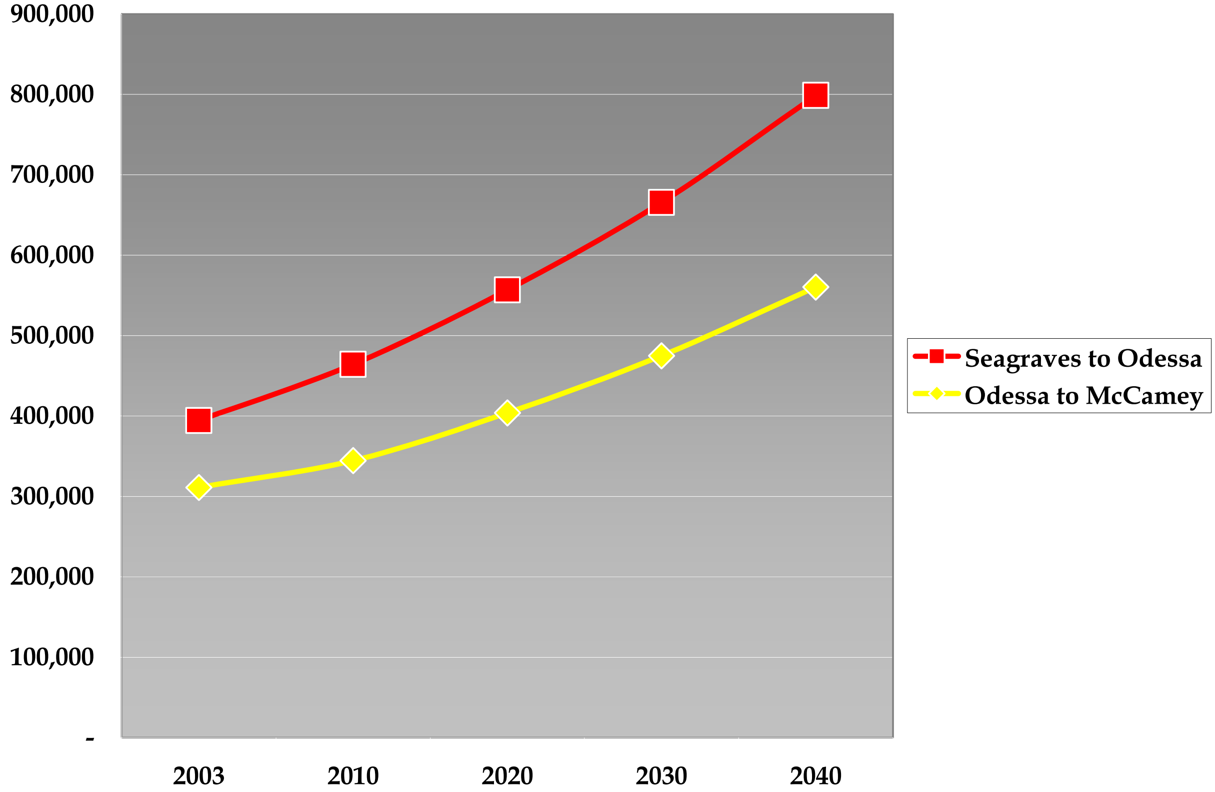
As shown in figure 3.4, TRANSEARCH estimates that total truck traffic on U.S. 385 will grow significantly from 2003 to 2040. During this period, total trucks (or truckloads) will grow by 103 percent between Seagraves and Odessa. Between McCamey and Odessa, truckloads will increase by 80 percent. The figure below shows the change in total trucks

[6] 2003 TxDOT Truck Flowband Map shows approximately 1,100 average daily trucks on U.S. 385 in the study area.

[7] TxDOT counts show about 730 daily trucks. The TRANSEACH data are modeled and are not always calibrated to field counts.

for these two segments into the future. The portion of U.S. 385 between Seagraves and Odessa will experience an increase of 405,000 trucks – growing from 394,000 in 2003 to 799,000 in 2040. Between McCamey and Odessa, trucks will increase by nearly 250,000 – from 311,000 in 2003 to nearly 560,000 in 2040. These growth rates become important as we forecast rail diversion potential and revenue into the future.

Figure 3.4 U.S. 385 Total Truck Growth 2003 to 2040
Segment Average Seagraves to Odessa versus McCamey to Odessa



Source: TRANSEARCH.

Diversion Estimate

To estimate the diversion potential for the corridor, this study utilizes the 'select link analysis' method described above to first identify the total number of truck trips on the U.S. 385 corridor. To narrow the number of trucks and trips eligible for rail diversion, we used a series of filters to eliminate unlikely origin-destinations, distances, and commodities for both primary segments of the proposed rail link: Seagraves to Odessa and Odessa to McCamey. The distance screen limits the trips to those of approximately 330 miles or longer, to coincide with the rail distance to major metropolitan areas such as Dallas/Ft. Worth. For some commodities, we relaxed the distance screen because the commodities tend to be rail amenable at shorter distances. Those commodities include some agricultural commodities, several classes of non-metallic minerals, chemicals, and other bulk materials. Because our research and field interviews indicated that the TRANSEARCH data underestimates agricultural commodities of the region, we augmented the TRANSEARCH data with 2003 statistics from the U.S. Department of Agriculture. This was especially important for the Seagraves to Odessa section of the corridor due to the relatively high potential railcar generation from local agriculture. Finally, we used the average Texas rail shares by commodity class to generate estimates for the 50 major commodity groups shown in Table 3.5.

Seagraves to Odessa

Using these parameters, the new rail link between Seagraves and Odessa has the potential to divert 34,129 annual trucks from U.S. 385 to rail in the build year (2010), representing about 6,701 annual rail carloads (about 22 carloads per weekday). The commodity class with the greatest potential for diversion is chemicals, accounting for over 33 percent of the diverted trucks. The next most important rail divertible commodity classes are non-metallic minerals and farm commodities, representing 26 percent and 15 percent of diverted truckloads, respectively. Petroleum/coal products and food and kindred products are also important divertible commodity classes, followed by primary metals, and clay/concrete/glass/stone, and transportation equipment. The diversion totals do not include potentially divertible containers because of the lack of a regional container shipment terminal.

McCamey to Odessa

Beginning in 2010, the new rail connection has the potential to divert 32,137 annual trucks, representing 5,600 carloads, from the U.S. 385 corridor between Odessa and the McCamey area (as far south as I-10). Like the U.S. 385 corridor between Odessa and Seagraves, the top divertible commodity class on this section is chemicals, accounting for 55 percent of the potentially divertible trucks. The next most important commodity class is petroleum/ coal products, followed by food and kindred products, representing 18 percent and 8 percent respectively.

Table 3.5 Railcar Demand Summary
Truck-to-Rail Diversion Potential (Annual)

Segment	2003 Base Year	2010 Build Year	2020 Mid Term-1	2030 Mid Term-2	2040 Long Term
A: Seagraves to Odessa	5,839	6,701	8,675	10,764	15,122
B: Odessa to McCamey	5,312	5,600	6,772	7,199	8,635

Source: TRANSEARCH, USDA, STB Carload Waybill Sample, Interviews.

3.5 Expansion Demand

Expansion demand is the number of railcars generated from expansion of existing shippers located on the line or from new shippers that located or relocated to the area for its improved rail service. This is new demand resulting from expansion accruing in addition to the diversion. Few public studies describe the expansion demand potential of new rail facilities, especially in rural areas. Through the interviews conducted for this study, we identified limited expansion demand for the new alignment. While most shippers interviewed said they would change shipping methods from truck to rail with a new rail line in close proximity, only one interviewee explicitly said the new line alone would attract new businesses. That company, specializing in peanut processing, said the new line would lead them to relocate their rail shipping operations from another part Texas. The resulting move would generate up to 400 annual railcars of peanuts and peanut byproducts.

The interview process for this study was limited. There is likely to be other shippers that the new rail service would attract to the region, but an estimate would be nothing more than an educated guess. Based on the commodities produced in the region, other companies that would potentially relocate would include peanut and cotton processors and chemical or fertilizer companies. In the case of the peanut company and its estimated 400 expansion carloads, we include most of these in the diversion estimate because the company produces 80 percent of its crops in the study area and drays them by truck to their rail transload facility in Central Texas.

3.6 Success Factors

The diversion estimate considers traffic on two segments of the proposed alignment – from Seagraves to Odessa and from Odessa to McCamey. To provide additional detail on the relative use and potential success of the segments, this section presents some findings from further analysis of the origin-destination characteristics of the rail diversion analysis.

Odessa to McCamey

Because there are no major shippers or demand centers on the segment between Odessa and McCamey, the traffic on this segment is almost entirely "through" rail traffic. The majority of this through rail traffic originates or terminates in the 16 study area counties – so this part of the rail alignment would essentially serve as an alternative through connector to the national Class I rail system. Many of the origin-destination pairs that would use this new consist of one of the 16 study area counties – especially Ector and Andrews Counties – and a trading partner region to the south or southeast. The ability of the new rail connection to attract any meaningful level of traffic rests on whether the South Orient Line, owned by Texas al Pacifico (TXPF), can accommodate the increased railcars generated by the connection to Midland-Odessa. The South Orient would need to provide a viable connection to the national Class I rail network.

Seagraves to Odessa

The portion of the alignment between Seagraves and Odessa differs from the segment between Odessa and McCamey because it accommodates a higher level of local shipping demand. Because potential rail shippers are concentrated in several locations along the corridor (the Seminole area, the Odessa region, and to a lesser extent, Andrews County), this segment is characterized by a higher percentage of originating and terminating traffic than the southern leg between Odessa and McCamey.

The Seminole area, just 16 miles south of the current WTLC terminus at Seagraves, provides the greatest concentration of rail amenable shippers without local rail service. The most likely rail shippers from the Seminole area include peanut processors, cotton gins (producing cottonseeds), and chemical/fertilizer producers. Each of these industries ship commodities that are rail amenable and rail would offer some savings versus current truck rates.

Additional shippers, especially chemical shippers, are around Andrews. There are also numerous existing and potential rail shippers in Odessa that would potentially use this new line. However, due to the long distance with relatively few shippers between Andrews and Odessa, the costs for construction and maintenance may inhibit investment.

4.0 Financial Feasibility Analysis

This section compares the demand estimates against the costs of developing the rail line and explores financing options. The overarching assumption for this financial analysis is that public funding will either not be available for this project or will form a small part of the total financing package. This assumption is based on the reality of the current transportation funding shortfall at both the state and national level and the number of projects already in the funding queue. As a result, this financial analysis bases its revenue estimates on fee income from a carload-mile or ton-mile surcharge for use of the proposed rail line. While the LEAP RRTD should not summarily dismiss the possibility of public funding altogether, the likelihood in today's political environment means that the RRTD should base the feasibility of this project largely on its ability to provide a positive return on investment.

4.1 Rail Project Financing National Examples

Several national rail financing examples, described in Table 4.1, provide additional context for the proposed rail connection of this study. The main difference between these recent projects and the one proposed in this study is the implemented projects are in urban areas, often serving as connectors to major traffic generators such as international maritime ports.

Table 4.1 National Rail Financing Examples

Project	Characteristics
Alameda Corridor[a]	
Location:	Los Angeles, California
Financing:	$2.4 billion; bonds secured by user fees with annual increases pegged to inflation. Initial container fee $15.00 per 20-foot equivalent unit (TEU); $4.00 per empty container; $8.00 per carload (not intermodal). As of January 1, 2006; $16.75, $4.47, and $8.93 respectively.
Description:	20-mile triple-track rail link between Port of Los Angeles/Long Beach and transcontinental railroads in East Los Angeles; 10 miles in a 33-foot deep, 50-foot wide trench.
Railroads:	Union Pacific, BNSF
Annual Traffic:	45 trains per day; 17,824 trains per year
Reno Re-Trac[b]	
Location:	Reno, Nevada
Financing:	$265 million. $111.5 million bond secured by hotel room tax, special downtown assessment district, sales tax increase; Union Pacific Railroad ($17 million); TIFIA direct loan ($50.5 million); Federal grants: ($21.3); other sources (including interest and cash on hand)
Description:	1.75 miles double track in a 54-foot wide, 33-foot deep trench to grade separate tracks through Downtown Reno; includes 11 street bridges
Railroads:	Union Pacific
Annual Traffic:	14 trains per day current; 24 trains per day future
Shellpot Bridge[c]	
Location:	Wilmington, Delaware
Cost:	$13.9 million from Delaware Department of Transportation. Carload fee for 20-year repayment term. $35 per carload for first 5,000 carloads annually, then $5 per carload for over 50,000.
Description:	Rehabilitation of bridge to allow access for NS from Northeast Corridor to the Port of Wilmington
Length:	Single-span bridge
Railroads:	Norfolk Southern
Annual Traffic:	7,000 monthly carloads

[a] Alameda Corridor Transportation Authority web site.

[b] City of Reno web site, TIFIA Project Fact Sheet, http://tifia.fhwa.dot.gov/fs9.htm.

[c] Delaware Department of Transportation, Shellpot Bridge is Open for Business, Press Release, September 2, 2004 and The Shellpot Bridge: A Public/Private Partnership That Worked, Review of Network Economics, March 2008.

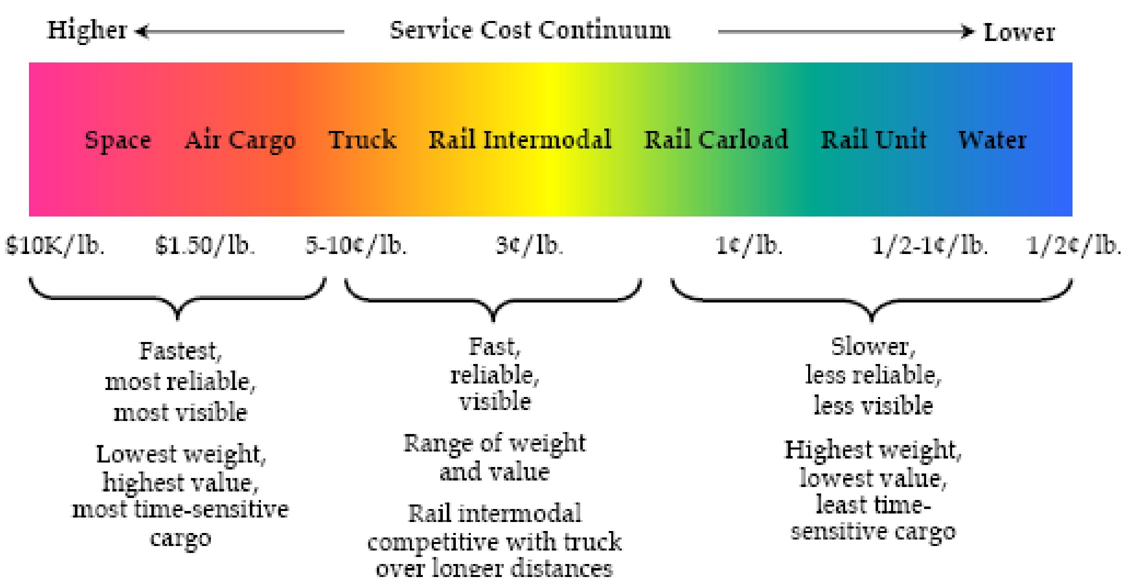
In each of these examples, cost recover relies, at least in part, on carload revenue. For this study, the following sections outline the methodology and application of a carload fee against the costs of development.

4.2 Revenue Estimate Methodology

The most direct revenue capture mechanism is a carload-mile or ton-mile surcharge for using the proposed rail line. The challenge of establishing the toll rate is the ability to generate a stream of revenue sufficient to cover the costs of construction, operations, and maintenance while providing for an overall freight rate that is competitive with trucking. This study focuses on the first financial hurdle – construction costs – and compares the freight rail revenue over the short and long term to these costs first. If revenue does not cover construction costs, greater shortfalls will result with the addition of start-up, operations, and maintenance costs.

Recognizing that new rail operations would chiefly derive traffic from cargoes diverted from trucks, we estimate average per-mile and per-ton-mile trucking rates as a benchmark for developing rail rates. The goal of developing the rail rates is to set a carload-ton-mile rate that would be competitive with trucking while maximizing revenue generation to pay down the construction financing or continued operations and maintenance. Figure 4.1 illustrates where rail and truck both fit on a continuum of freight pricing – illustrating that freight-rail is more economical per pound shipped.

Figure 4.1 Goods Movement Service Cost Continuum



Source: Cambridge Systematics, Inc., AASHTO Freight Rail Bottom Line Report, 2002.

Truck Rate

We estimate the current per-mile truck rate for the study area at $2.00. This is the rate typically charged by the motor carrier to the shipper and includes operating costs (labor, fuel, insurance) and capital costs (equipment). The rate is consistent with trucking industry average costs as of 2006 and inflated by 3 percent to reflect 2007 prices.[8] The rate also reflects a weighted adjustment for chemical shipments which accounts for up to 36 percent of the tonnage shipped in the core study area counties.[9] The average per-mile rate for chemical (fertilizer) transport in the region is currently $2.50 per mile while the estimated regional average for other basic commodities is $1.70 per mile. The average per-mile truck rate of $2.00 translates to $0.09 per ton-mile.

Rail Rate

To arrive at the rail rate, we start with the American Association of Railroads (AAR) estimate of the average revenue per ton-mile of the U.S. freight-rail system, which in 2007 is $0.03.[10] Applying this rate to the average carload payload in the region from the TRANSEARCH data (111 tons), the average carload on the new rail system could theoretically generate is $3.30 per mile. Converted to a truckload average payload factor for the region (22.5 tons), the national average rail rate in regional truck equivalents is $0.68, beating the truck rate by $2.62 per mile, or nearly 300 percent. For example, if one railcar and a platoon of 5 trucks were traveling parallel to one another on the new track and U.S. 385, respectively, and if the platoon of 5 trucks carried the same combined weight (111 tons) as one railcar, the total cost of running the trucks would be $9.80 ($2.00 * 4.9) per mile versus $3.30 per mile for the railcar, or a rail savings of nearly 300 percent.

By comparing the national average rail rate to the local trucking rate, we establish a low end for the rail rate that could be charged in the national rail market. The rate is far more competitive than the trucking rate, which means there is room to move the rate upward in an attempt to cover costs of the new development.

To establish the high-end rail rate, we take into account the marginal cost difference between the new infrastructure and existing rail infrastructure over the total distance of a trip. This high-end estimate builds off the assumption that to be competitive with the trucking industry, the per-mile rail rate has to beat the per-mile truck rate, at least over the

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8 Bureau of Labor Statistics Consumer Price Inflation Calculator 2006 to 2007.

9 Based on analysis of TRANSEARCH 2003 data. Chemicals, including fertilizer, are considered hazardous materials and increase truck operating costs due to insurance requirements. Rail is a safer method of shipping these materials, so insurance costs are much lower relative to truck.

10 AAR Overview of U.S. Freight Railroads. January 2008.

total trip length. This means that a carload-mile fee could be higher on the newly constructed track miles than the truck rate for parallel highway miles (e.g., U.S. 385), but the average per-mile rail rate for the entire trip must still beat the equivalent per-mile truck rate. For example, the rate charged to use the new rail line could be higher than the ton-mile cost of a truck carrying the same commodities on U.S. 385 if the total trip distance is long enough to favor rail by spreading out the higher marginal costs of the new rail infrastructure over the lower marginal costs of the long haul rail trip. This presumes that costs are lower on existing rail infrastructure where capital costs, while significant, are not as high as new construction costs.

To arrive at a weighting we take into account the total rail trip distance – which we estimate for the study area averages about 650 miles – and determine the percentage of the trip on the new infrastructure. Since the average trip length for traffic originating and terminating in the study area counties is approximately 650 miles, and the average estimated trip length over the new infrastructure is 64 miles, the percentage of the trip on the new track is about 10 percent. The ton-mile fee proposed in this study reflects this weighting.

Defining Rail Unit Fees

Carload Fee. This analysis assumes the principal revenue stream would come from a carload fee assessed on each railcar. The carload fee is straightforward, as the per-ton-mile fee would apply at the same rate to each railcar. The most notable exception would be if the railroad started utilizing longer-than-standard railcar equipment.[11]

Container Fee. The most highly recognizable public-private rail project in recent U.S. history – the Alameda Corridor – relies heavily on container fees to generate revenue. The Alameda Corridor Authority, which operates the Alameda Corridor between the Ports of Los Angeles and Long Beach and the transcontinental railheads of Union Pacific and BNSF in East Los Angeles, charges $16.75 per intermodal unit. This form of revenue generation works well in places with sufficient container traffic. Because of the very low potential for intermodal traffic on the new rail link, this analysis does not propose a flat container fee, but rather assumes the sponsor would charge any containerized traffic the same rate as a standard railcar.

[11] The Shellpot Bridge in Wilmington, Delaware, financed by the Delaware Department of Transportation, has lost some revenue due to the increasing use of longer railcars that carry about twice as much freight. Since the agreement stipulates only "railcar" with no indication of length, the tenant railroad, Norfolk Southern, can legally use these longer railcar equipment, but this has resulted in an unanticipated revenue constraint.

4.3 Revenue Estimate

With the methodology established, the next step in the financial feasibility analysis is to establish a rail fee rate and then to determine the possible revenue stream into the future.

Rate Determination

Based on the parameters described above, the proposed rail line could charge a per ton-mile fee of up to $0.10. This rate is higher than the $0.09 per ton-mile rate charged by the trucking industry, but it allows shippers to access the national rail network and spread costs out over a longer trip. At the average rail trip-distance of 650 miles, the $0.10 per ton-mile rate provides savings of approximately 58 percent over trucking the same distance. This rate remains effective for truck-to-rail diversions down to trips of about 150 miles, where there is still a 2 percent savings with rail.

Revenue Stream

Using this rate and estimated railcar trip distances for both the Seagraves to Odessa and Odessa to McCamey segments of the alignment, we estimate first year revenue of $8.7 million, with $4.5 million from Segment A (Seagraves to Odessa) and $4.2 million from Segment B (Odessa to McCamey). Table 4.2 shows annual revenue at 10-year milestones (2010, 2020, 2030, and 2040) and shows the total revenue stream between 2010 and 2040. According to this estimate, the new rail line would generate approximately $375.3 million through 2040.

Table 4.2 Revenue Stream through 2040 and Annual Milestones 2010 to 2040 (Millions of $2007)

	Annual Revenue at 10-Year Milestones				Total Revenue Stream (2010 to 2040)
Segment	**2010 Build Year**	**2020 Mid Term-1**	**2030 Mid Term-2**	**2040 Long Term**	
A: Seagraves to Odessa	$4.5	$5.8	$7.2	$10.1	$209.6
B: Odessa to McCamey	$4.2	$5.1	$5.4	$6.5	$165.7
Total	**$8.7**	**$10.9**	**$12.6**	**$16.6**	**$375.3**

4.4 Financial Feasibility

Table 4.3 shows the gap between total revenue generation through 2040 and total costs of construction (including financing), operation, and maintenance through 2040. The gap between the total cost of the project and the total projected revenue is $634.9 million through 2040 in constant 2007 dollars.

Table 4.3 Financial Feasibility Summary
2010 to 2040

		Estimated Costs ($ Millions 2007)	
Alignment Segment	**Total Cost**	**Total Revenue**	**Funding Gap**
A Seagraves to Odessa	$521.80	$209.6	($312.2)
B Odessa to McCamey	$488.6	$165.7	($322.9)
Total	**$1,010.3**	**$375.3**	**($634.9)**

Strategies to Close the Financing Gap

With an estimated shortfall of $634.9 million between the revenue projection and the estimated costs, this project has significant financing gap, even with an aggressive economic demand estimate. In order to tighten the gap to make an appeal for public grants or assistance, the LEAP RRTD should consider several strategies.

Find a Railroad Partner

Investment in the line by a credible rail partner would not only help close the financing gap but would lend more credibility to the project. During the interview process executives of Permian Basin Railways, the parent company of both the West Texas and Lubbock (WTLC) and the nearby Texas New Mexico Railway expressed interest in operating over the new line. With this study in hand, the RRTD could approach Permian Basin Railways to gauge their interest in an equity partnership.

Pending Federal legislation, if enacted by Congress, would make this idea more palatable to Permian Basin or another railroad partner. The legislation, strongly supported by both the American Association of Railroads (AAR) and the American Shortline and Regional Rail Association (ASLRA), would provide a 25 percent tax credit for infrastructure investments.[12] This subsidy, if enacted, would allow short line and regional railroads to invest in infrastructure with significant write-offs.

Attract a "Mega Shipper"

Most railroad companies build shortline or regional railroad extensions to serve a new or expanding "mega shipper," usually a large freight generator capable of producing sufficient carloads to secure financing for the extension. Most mega shippers served by shortlines are bulk or extractive industries, such as mining. In Arizona, Permian Basin Railways is currently building a 10-mile extension of its Arizona Eastern Railway to serve a Phelps Dodge mine. The project is financially feasible because of a guaranteed stream of carloads that will reliable produce revenues.

Public Financing Strategies

There are several possible sources of Federal funding for freight rail project available through the most recent surface transportation bill, Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU). Under SAFTEA-LU, U.S. DOT will consider applications for freight rail projects under two programs:

- **Transportation Infrastructure Finance and Innovation Act (TIFIA) (Section 1601).** The TIFIA program provides loans and credit assistance for major transportation investments of national or regional significance. Available funding between 2005 and 2009 is $610 million.

- **Rail Rehabilitation and Improvement Financing (RRIF) (Section 9003).** The RRIF program provides loans and credit assistance to both public and private sponsors of rail and intermodal projects. Its 2005-2009 funding level is $35 billion.

At the state level, the **Rail Relocation and Improvement Fund** is the only officially designated program for rail development. Authorized in 2005, the Texas Legislature has not yet capitalized the fund. Once funded, it will allow the State of Texas to issue short and long-term bonds to construct rail facilities owned by the Texas Department of Transportation. If the Legislature allocated money to the fund, monies cannot be obligated to a project unless the State or appropriate MPO has identified the project (and its benefits) in a statewide or metropolitan strategic plan.

In order to justify the use of these or other public funds, project proponents would need to demonstrate the ability of the project to generate significant public benefits. The following section provides rough estimates for this project using national factors.

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[12] ASLRA. Policy Papers. http://www.aslrra.org/legislative___regulatory/Policy_Papers/.

4.5 Public Benefits Estimate

While this study assumes that a carload ton-mile fee is the most likely source of revenue for this project, some limited public funding may be available to assist in closing the financing gap between costs and income. In order to justify public expenditures on privately owned railroad infrastructure, the state or local government would need to identify and, where possible, quantify the public benefits. To provide an illustrative example of the extent of possible public benefits resulting from the project, we estimated benefits using readily available national factors. Like many similar rail proposals, we find that the majority of public benefits of this proposal result from the decrease in truck vehicle miles traveled (VMT) because of truck-to-rail diversion. The public benefits fall into several measurable categories including highway maintenance, safety, and emissions costs. Based on our analysis, we estimate a total VMT reduction of approximately 1.85 billion truck miles over the 30-year period of the project-financing period. This translates to an average of 62 million fewer annual truck vehicle miles. Table 4.4 summarizes the results of the benefits estimates for this study for three categories.

Table 4.4 Potential Public Benefits Estimate
2010 to 2040

		($ Millions 2007)
Benefit Category	**Unit Cost[a]**	**Savings**
Highway Maintenance	$0.222/VMT	$410.1
Roadway Safety	$0.094/VMT	$173.6
Emissions	$0.010/VMT	$18.5
Total		**$602.1**

[a] Highway maintenance costs from Addendum to 1997 FHWA Cost Allocation Study Final Report U.S. DOT, FHWA, May 2000. Weighted average pavement rate for 80 kip 5-axle trucks on rural and urban Interstates. Safety costs from National Highway Traffic Safety Administration, 2004 National Statistics. Emissions savings represent the difference between truck and train emissions from EPA Mobile 6 and "Monetary Values of Air Pollution Emissions in Various U.S. Cities," Wang and Santini, Transportation Research Board Paper No. 951046, 1995. All factors inflated to 2007 using CPI.

Table 4.4 shows the largest share of public benefits result from highway maintenance savings, chiefly from pavement savings, resulting from fewer trucks on North American highways. Roadway safety savings, which result from fewer trucks on the roads and a commensurate decrease in the accident rate, constitute another important benefits category. Cost savings associated with emissions reductions from a shift from truck to rail are also measurable. Utilizing the truck VMT estimate and applying the benefits multiplier factors in Table 4.3, we estimate that the project would generate approximately $602.1 million in public benefits over the 30-year financing period. If applied to the total project costs as a credit, the estimated public benefits reduce the gap between costs and available funding from a deficit of $634.9 million to a shortfall of only $32.8 million.

Other Potential Benefits

In addition to the public benefits estimated in this study, the project could generate additional quantitative and qualitative public benefits, including:

- Personal and private [freight industry] savings from reduction in traffic congestion and delay, principally accruing in large urban areas with freeway truck bottlenecks;
- Direct employment from jobs created directly through the transportation investment (construction, railroad, and shipping jobs);
- Indirect employment generated from the overall increase in demand for goods and services from the wave of direct employment; and
- Tax benefits of increased payroll, sales, and corporate income tax.

We did not estimate these benefits for this study, but one could measure them with additional effort. For example, one could estimate employment effects using a regional input-output model.

Beyond the public benefits, private benefits could be significant, resulting mostly from logistics costs savings accruing to private shippers as they capture the difference between the higher truck and the lower rail rate.

Applicability

While the potential public benefits resulting from this project could be substantial, the vast geography of the rail-trading region makes it difficult to identify specific beneficiaries and financial participants. Texas, most of the U.S., and many Mexican states are the likely beneficiaries of reduced truck VMT and the resulting benefits, but the challenge of constructing an institutional arrangement to close a significant part of the funding gap is daunting. Public financing approaching the level of benefits identified in this analysis would be unprecedented for a rural rail project and would face strong competition for public dollars.

5.0 Alternative Opportunity

During the course of this study, we found that the most potentially cost-effective way for the LEAP Rural Rail Transportation District to increase freight rail mode share within its jurisdiction might be to pursue the development of a new industrial rail spur as the centerpiece of a "Freight Village" concept development. Such a development would concentrate freight rail shipping activities at one location focused around a high-quality rail spur with modern switching and signaling equipment. This type of project might meet local (Ector and Midland Counties') demand for local rail service while providing sufficient carload traffic and minimal mainline interference to attract Union Pacific cooperation. The best location for the spur and development is south of the UPRR mainline between Midland and Odessa to avoid interference with I-20 Business. To provide more seamless operations with the UPRR, the spur project may require construction of an additional siding. The preliminary costs estimates for this concept (rail infrastructure only) range from $2 to $3 million and could be part of the overall financing of the surrounding industrial development.

■ 5.1 Background

Historically rail served many industries in the LEAP RRTD. In recent years, Union Pacific adapted operations on the TP line to serve premium long-distance freight, leaving many local shippers without rail service. Today the site characteristics of many of the historic rail shipping industries along the TP line in the Midland-Odessa area do not reflect the reality of today's UPRR operations. In many cases, the original builders linked individual warehouses or other industrial buildings directly to the TP mainline with a short spur with manual switches. These spurs, in most cases, only accommodate a few railcars at a time. The amount of time required to switch and assemble railcars would be cost prohibitive, because it would reduce capacity on the mainline.

This business practice is not unique to Union Pacific. Throughout the U.S., Class I freight railroads are consolidating switching and train building activities to fewer locations. In most cases, America's freight railroads are moving out of the business of collecting small railcar shipments as they have traditionally done. Where there is sufficient infrastructure to support switching activities without adversely affecting mainline operations, Class I railroads continue to collect local shipments. In many of these situations, the Class I's rely on shortline or terminal railroads to provide the switching and provide pre-assembled trains to pull.

Current Local Service

While the railroad has not disregarded local service entirely, low or sporadic railcar generation by many shippers along the line does not sustain a robust local service. This is important because railroads are increasingly interested in drop and pull, high volume shippers, of which there are few within the Rail District. Currently Union Pacific operates a local service beginning in Monahans and connecting to Ft. Worth twice weekly. Dubbed the "Ft. Worth Local," the train serves several major shippers, including the Flint Hill Resources facility. Given the limited capacity on the TP mainline, it simply does not make business sense to perform small switching operations to drop or retrieve one or two cars from many disparate shippers spread along the 20 miles of mainline between the western edge of Odessa and the eastern edge of Midland. Instead, the service focuses on major shippers – like Flint Hill.

5.2 Industrial Access

To overcome these limitations, the RRTD might pursue development of an industrial access spur to concentrate shipping in an economically feasible way. As envisioned in this study, the spur would form the centerpiece of an industrial development to encourage clustering of rail intensive industries. With multiple industries located in a joint development, the idea is that they could generate enough traffic to produce a pre-assembled train. The businesses could share in the costs of building the spur, or a developer could build it with costs recovered through rents or other use fees.

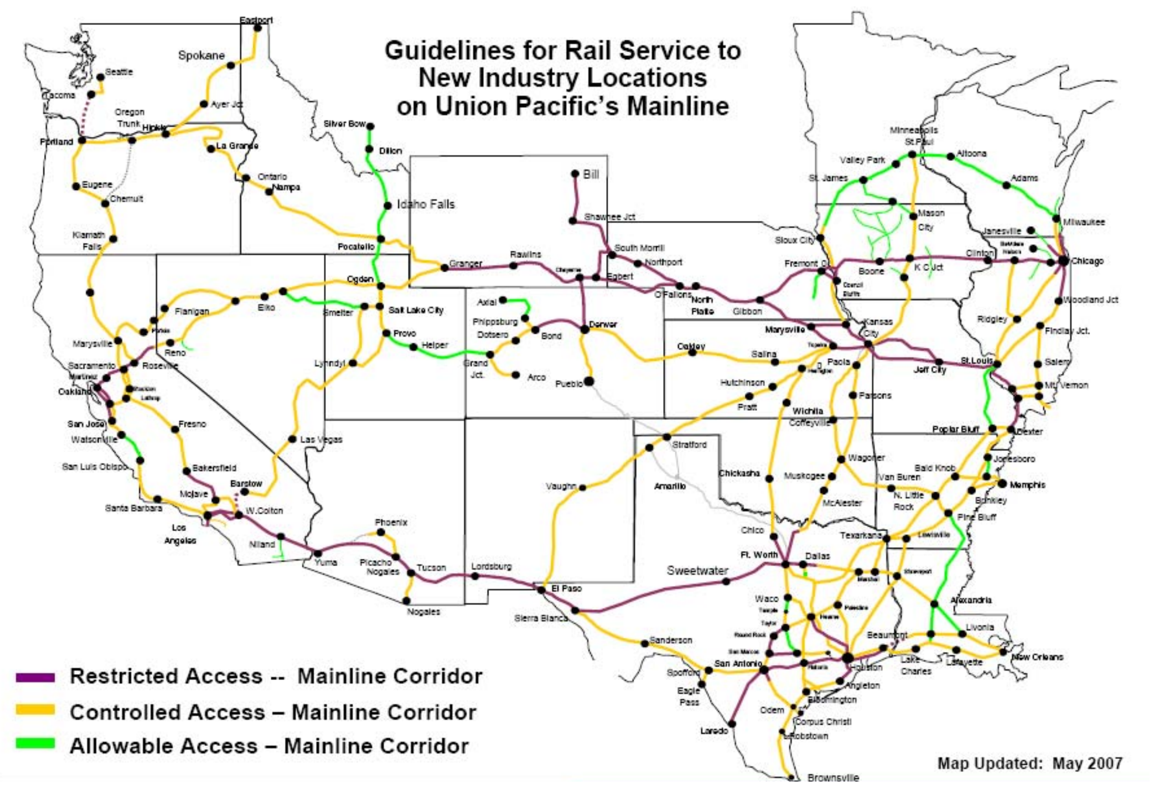
There are several factors complicating this proposal and the physical design standards and traffic volume thresholds would have to be sufficient for UP to allow access. Interchange standards with the TP line are the highest required by Union Pacific because of its high speed, high traffic volume, and premium product mix (including international containers). Within Union Pacific nomenclature, the railroad classifies the TP line as a **Restricted Access – Mainline Corridor.** Table 5.1 describes the characteristics of a Restricted Access – Mainline Corridor in relation to UP's other two industrial development classifications. Figure 5.1 describes the UPRR mainline network.

Table 5.1 Union Pacific Mainline Corridor Classification

Type	Characteristics
Restricted Access	• Mainlines within the UPRR network that are the most operationally challenged based on line density, service sensitivity/premium product corridor, lack of surplus capacity, grade and operating conditions. • Objective is to manage new industry locations in a manner that prevents impediments to fluid operations and service, thus making any new facility transparent to operations with any addition to the network causing no collateral delay.
Controlled Access	• Varying degree of operational challenges within the network based on line density, premium product mix, slack capacity and directional operations. • Objective is to avoid train make up or switching moves on the mainline and minimize collateral delay.
Allowable Access	• Relatively low density lines, some slack capacity available and a non-premium product corridor.

Source: Union Pacific, *Guidelines for Rail Service to New Industry Locations*, September 2006.

Figure 5.1 Union Pacific Mainline Corridor Classification



Source: UPRR

5.3 Conditions to Access the TP Line

To access the TP line, either as an industrial spur or as part of an interchange connection to a longer rail link to McCamey or Seagraves, Union Pacific would require the RRTD to meet certain physical, operational, and demand conditions.

Physical and Operational Conditions

Union Pacific's "Guidelines for Rail Service to New Industry Locations" outlines the infrastructure guidelines for Restricted Access Mainline Corridors. Table 5.2 summarizes the conditions.

Table 5.2 Conditions to Interchange with UPRR TP Line

Characteristics
1. Customer infrastructure must allow a full train length to clear the mainline without stopping to line switches. This requires approximately 8,500-9,000 ft of running track capacity due to train length and signal systems.
2. Mainline power turnouts required to enable train to clear mainline in one continuous move if applicable.
3. If customer operations require varying directional flow, customer facility should access mainline from both directions.
4. Customer operation must accommodate the switching or repositioning of moves clear of the mainline or controlled sidings. Where unit trains are handled, availability of yard air at the facility may be required, depending on circumstances.
5. Customer must have reasonably close access to power crossovers to avoid extensive counter flow movements in double track territory (if applicable).
6. Customer facilities handling less than unit train volumes must accommodate spot upon arrival and have sufficient capacity to accommodate both loaded and empty car storage. Facilities set up to handle unit trains must have the capability to chamber a minimum of one complete train
7. Infrastructure is 286K compatible, if required by customer operations.
8. Customer infrastructure compliant with UP track and signal standards.
9. Customer facility designed for a drop and pull service.
10. Customer facility designed to accommodate customer or third party switching, including Remote Control Locomotive (RCL) application.
11. Customer facility layout does not require commodity or order specific switching assignment of railcars to unloading tracks by Union Pacific.
12. Additional access requirements determined by local conditions and site-specific considerations.
13. Train operations do not block road crossings.

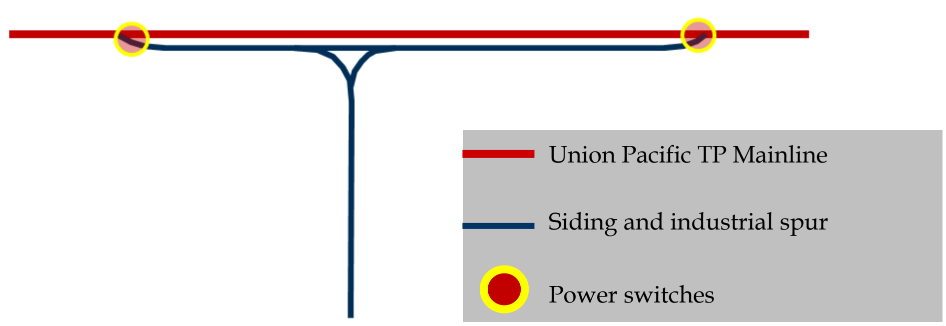
Source: Union Pacific, *Guidelines for Rail Service to New Industry Locations*, September 2006.

In order to meet these requirements, the RRTD and/or the developer of the industrial spur would need to coordinate closely with UPRR. During this study, Union Pacific offered several other suggestions for the RRTD related to the industrial spur idea. Those include:

- Ensure that the interchange track or siding (see numbers 2 and 3 above) is between 8,000 and 10,000 feet long. It should have mainline power switches at each end to allow for switching in either direction (West or East). This requirement is applicable for either the industrial spur idea or any shortline connection (Seagraves or McCamey).
- Power switches and signaling should be consistent with the character of the TP line to ensure that spur operations, know as "work events" do not slow long-distance traffic.
- If the RRTD develops the infrastructure, UPRR would potentially provide switching during a start-up phase of up to a year. After that, the RRTD or its developer/partner would need to employ a terminal switching company to assemble strings of carloads for drop and pull service (see number 9 above).
- According to Union Pacific, the best location for the spur and development is south of the UPRR mainline between Midland and Odessa to avoid interference with I-20 Business.

Based on these conditions, Figure 5.2 shows the conceptual physical layout of the industrial spur.

Figure 5.2 Conceptual Layout of Industrial Spur



Demand Conditions

Recently implemented industrial access project typically focus on a single high-volume shipper (mega shipper), such as ethanol or rock quarries. The idea of establishing an industrial spur for this purpose – to consolidate local freight demand to gain access to a busy Class I corridor – is relatively new. According to Union Pacific, no community has undertaken this type of project yet, although several are currently contemplating or planning these types of mixed commodity facilities. Like Midland-Odessa, communities planning these types of facilities are seeking to replace local Class I rail service lost through the recent 'rail renaissance' by matching the realities of the current Class I market priorities.

Through this study Union Pacific has expressed renewed interest in providing better local service to Midland-Odessa given the recent 'oil boom' and associated increase in demand. The commodities now in higher demand include drilling mud, frac sand (used in the drilling process, manufactured sand from the upper Midwest and Canada), and pipe. Union Pacific also believes demand is increasing for construction materials (e.g., lumber) related to the housing shortage in the region. The other potential source of demand is the burgeoning wind energy industry and its associated need for turbines.

Even with this increased interest, Union Pacific is unwilling to provide a benchmark for carload demand. The railroad will entertain offers that meet established profitability goals for commodity groups as set by the railroad's marketing groups.

5.4 Proposal to UPRR

If the RRTD decides to pursue this idea, UPRR requests that the Rail District provide an official proposal describing the exact location of the connection, the length of the siding, and the magnitude of the facility (carload capacity). The railroad also asks that the RRTD provide estimates of carload traffic, including commodity type with annual and weekly generation rates.

If the proposal includes a linkage to a shortline, such as the McCamey or Seagraves connections, the RRTD should submit the proposal to UPRR's Short Line Group. Class I railroad have some obligation, according to Surface Transportation Board regulations, to connect to shortlines or regional railroads with sufficient demand. UPRR would evaluate the proposal in light of regulations and market conditions.

If the proposal relates only to an industrial access spur for local Midland-Odessa shipping needs, the RRTD should send the proposal to Union Pacific's Industrial Development/ Real Estate group.

Building on the findings of this study, the RRTD could begin to assemble the information needed in a formal proposal to Union Pacific. The information in the study is a good starting point for this proposal, but it would require additional analysis to estimate the demand for the new facility, including interested parties and railcar generation.

Financial Participation

In some limited circumstances, UPRR may offer some financial assistance to offset the cost of mainline switches. Participation depends on the customer base (carload demand) which UPRR did not specify. Even with this potential, the RRTD should not rely on financial participation from the railroad. Currently, UPRR is not participating financially in any other type of infrastructure investment. In the past, the railroad provided a refund agreement on a per car basis, but this practice ended more than a decade ago.

6.0 Conclusions and Implementation Strategies

This study focuses on determining whether a new rail line between Seagraves and McCamey is economically or financially feasible. The overarching goal of this effort is to increase rail mode share in the LEAP Rural Rail Transportation District and surrounding counties. At the beginning of this report, we outlined the four principal questions the study intended to answer. Those questions are:

- Would a new rail line attract sufficient traffic to warrant its construction?
- Which existing shippers in the region would use the line and would they and/or the rail carriers provide adequate financial backing to support construction and continued operation?
- What are the potential obstacles – physical, financial, or regulatory – that inhibit development of the rail line and how can the rail district and its partners overcome them?
- What are the next steps and actions that TxDOT, LEAP, or other partners can take to move rail development to engineering, financing, and construction?

Armed with the results of the data analysis and interviews conducted for the study, the answers to these questions are now clearer. This section articulates responses to these questions and frames those responses in an action-oriented format to guide implementation of viable actions.

6.1 Would a New Rail Line Attract Sufficient Traffic to Warrant Its Construction?

Based on the projections of this study, the new rail line would generate measurable traffic but not enough to warrant its construction given high costs of development, maintenance, and operations versus potential revenues. We estimate that between 5,600 and 6,700 annual railcars could use the line in its first year (2010), representing 15 to 18 railcars each day, or enough for two to three trains per week. While this number might sustain the operations of an existing shortline or regional rail operator, it is not enough to cover the costs of developing an extensive 150-mile rail connection.

There are limited options for the RRTD to overcome this situation. The most viable option is for the RRTD to work with its economic development partners to pursue additional traffic generators – including at least one or two "mega shippers" (as discussed in Section 4.0).

6.2 Which Shippers Would Use the Line and Would They and/or the Rail Carriers Provide Adequate Financial Backing to Support Construction and Continued Operation?

Companies shipping the commodities with the highest potential for diversion are most likely to use the new line. These shippers include companies producing or using chemicals (including fertilizer); non-metallic minerals; farm products (e.g., peanuts, cottonseed); food and kindred products; paper; primary metals; and petroleum/coal products. The greatest concentrations of shippers are at Seminole, Andrews, and the Midland-Odessa area.

Based on our interviews and financial analysis, we believe the shippers using the line would be willing to pay up to $0.10 per ton-mile to use rail instead of truck. As outlined in Section 4, this rate provides savings versus truck for rail trips of 150 miles or longer with substantial savings accruing with greater distances. Applying this rate to the carload estimates produces over $375 million over a 30-year period from 2010 to 2040. The future may hold greater potential for truck-to-rail diversion if fuel costs continue to increase. As a general rule, the higher the cost of oil, the more attractive rail becomes as a shipping mode because of its lower unit costs.

We estimate the cost of construction, operation, and continued maintenance over the line during the same period at $1.01 billion, leaving a financing gap of $635 million.

6.3 What are the Potential Obstacles – Physical, Financial, or Regulatory – that Inhibit Development of the Rail Line and How Can the Rail District and Its Partners Overcome Them?

The gap between potential carload revenues and costs is the greatest obstacle facing the project. Given the magnitude of the shortfall, the RRTD would have to pursue aggressively several strategies to determine additional funding availability from several potential sources. As outlined in Section 4, the RRTD could find a railroad partner to help offset the costs. The Rail District could also partner with state and local economic development agencies in a targeted attempt to bring a mega shipper to the corridor to boost carload traffic estimates. Depending on the outcome of these steps – especially the ability to secure a rail partner – the RRTD might consider applying for Federal monies in from the TIFIA or RRIF programs. In the past, the State of Texas has awarded grant funding to several rural rail districts to fund small shortline rehabilitation projects. Given this precedent, the RRTD could propose a similar funding arrangement to the State Legislature.

If the project utilizes public monies, it must first demonstrate its ability to generate significant public benefits and must determine where those benefits accrue. Based on initial estimates calculated in this study, the project has the potential to provide up to $602.1 million in public benefits, principally through the reduction of truck VMT. Diverting trucks to rail provides long-term savings of costs associated with highway maintenance, safety, and emissions. If applied to this project, these public benefits could reduce the gap to just over $32 million. However, the project would face significant obstacles to procure this unprecedented level of funding for a largely rural freight rail project with benefits spread across a broad national and international geography.

Beyond financing, the RRTD will have to confront several physical and operational challenges associated with the mainline interchange to the UPRR in the cases of either the industrial rail spur or the longer connection (Seagraves and McCamey) rail connection proposals. In either case, the RRTD needs to present a formal proposal to the UPRR detailing the location, physical attributes, and demand characteristics of the connecting line.

Finally, the rail connection proposal extends beyond the current geographical jurisdiction of the LEAP RRTD. This situation prohibits any development activities outside the two counties. Before moving forward with any proposal involving counties within the proposed alignment (Gaines, Andrews, Crane, and Upton), the RRTD should consider extending its membership to encompass the entire development corridor.

6.4 What are the Next Steps and Actions that TxDOT, LEAP, or Other Partners Take to Move Rail Development to Engineering, Financing, and Construction?

To advance the development of rail facilities – whether the linear corridor or the short industrial spur – the LEAP RRTD should consider developing a formal proposal to submit to Union Pacific that would outline how the proposed development(s) satisfy the railroad's criteria for mainline access and provide sufficient carload demand. While this study provides much of the material necessary to form this proposal, the RRTD should work to identify more specifically the location and conceptual physical design of the interchange. In the case of the industrial spur, the RRTD would need to develop carload estimates by commodity through an analytical process similar to this one. The proposal might also benefit from the perspective of industrial developers, especially those with experience developing mixed transportation facilities (highway, rail, water, air etc.) Developing a formal proposal to access the TP line is the most important step at this time to developing rail facilities. Without the cooperation of Union Pacific and access to the national network, the RRTD's ability to advance engineering, financing, or construction is limited.